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## GROUP SUMMARY CC

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The Command, Control, and Communications (C3) Academic Group is an interdisciplinary association of faculty which consists of 18 faculty members who hold appointments in 8 departments/groups at the Naval Postgraduate School, plus the Curricular Officer. The C3 Academic Group has responsibility for the academic content of the Joint Command, Control, Communications, Computers, and Intelligence Systems curriculum and the Scientific and Technical Intelligence curriculum. C3 Academic Group faculty members carry out research in C4I systems, broadly defined, to support these two curricula.

During 1998, the C3Academic Group consisted of the following members:

Lieutenant Colonel Michael Mullady, USAF, Curricular Officer  
Professor Dan C. Boger (Command, Control and Communications), Chair  
Lecturer Rex A. Buddenberg (Information Systems Academic Group)  
Professor Ralph N. Channel (National Security Affairs)  
Professor Kenneth L. Davidson (Meteorology)  
Professor Donald P. Gaver (Operations Research)  
Lieutenant Colonel John Gibson, USAF (Command, Control and Communications)  
Professor Carl R. Jones (Systems Management)  
Associate Professor William G. Kemple (Command, Control and Communications)  
Professor Herschel H. Loomis (Electrical and Computer Engineering)  
Professor Orin E. Marvel (Command, Control and Communications)  
Associate Professor Gordon McCormick (Special Operations Academic Group)  
Associate Professor Paul H. Moose (Electrical and Computer Engineering)  
Associate Professor John S. Osmundson (Command, Control and Communications)  
Professor Patrick J. Parker (Command, Control and Communications)  
Associate Professor Gary R. Porter (Command, Control and Communications)  
Associate Professor Craig Rasmussen (Mathematics)  
Professor Nancy C. Roberts (Systems Management)  
Associate Professor Donald v.Z. Wadsworth (Electrical and Computer Engineering)

An overview of the Command, Control, and Communications (C3) Academic Group research program follows.

### MAJOR THRUST AREAS OF DOD RESEARCH

In the general area of communications and networks, the Command, Control, and Communications Academic Group continues efforts on the Global Broadcast System. This includes not only performing testing of the broadcast system and channelization but also evaluating what information should flow over the system. This area also includes efforts in combat identification; network analysis support for the combat identification program office is being provided. Another effort in this area is the Internet-to-Sea project, in which an evaluation of alternative ways for Internet capabilities to ships at sea is being done. The final effort in this area is DARPA/DISA Leading Edge Services ATM network project in which alternative ways are being evaluated of utilizing wideband network services, both for operational administrative uses, including evaluation of remote processing of data.

In the general area of decision support, the project in Adaptive Architectures for Command and Control is continuing which is evaluating alternative architectures for C2 structures based on task assignments. This effort continues the long involvement in human-in-the loop experimentation. Support is also being provided to Marine Corps C2 efforts through MCCDC activities. Efforts are also beginning in the Navy Command Center of the Future project; it is expected that evaluation of alternative architectures will be provided for this capability. Interactions with the newly-established C4I Decision Support Center is also being ramped up in order to provide them with modeling and simulation of C2, in general, and specifically C4ISR for precision strike.

In the general area of joint force planning and operations, N-6 and J-6 has requested that the Academic Group participate in numerous exercises and experiments, specifically Fleet Battle Experiments and the Information Superiority Experi-

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ments. Command and control expertise is provided to assist in design and assessment of the experiments. It is anticipated that these efforts will lead to further project work in the above areas.

### RESEARCH FACILITIES

The Systems Technology Laboratories (STL) comprise state-of-the-art facilities to support research on current and developmental command and control structures and C4I systems (broadly defined). The vision in developing the STL is to provide researchers access to not only systems which are currently being used by operational forces but also systems which are in development. This vision requires that state-of-the-art networking facilities be maintained within the STL and NPS as well as external to NPS through wideband connectivity. This connectivity is currently provided by a SIPRNET connection and by a connection to the DARPA/DISA Leading Edge Services ATM Network, as well as the NPS backbone.

The Secure STL (SSTL) contains SECRET facilities which support applications in command and control, wargaming and simulation, and communications. In the command and control, the primary application is the Global Command and Control System (GCCS); the installation, except for number of workstations, is identical to those used by the CINCs. The GCCS provides capabilities in reporting, charting, and monitoring of operational forces, and it supports OPLAN preparation and execution via the Joint Operation Planning and Execution System. In wargaming and simulation, the MAGTF Tactical Wargaming System, JANUS, and JPS have been installed. In communications, the Academic Group is the West Coast downlink site for the CONUS test satellite of the Global Broadcast System.

In addition to the SSTL, an unclassified STL and a multimedia lab which is shared with Computer Science is maintained. The unclassified STL provides research support via Internet connectivity and through a wide range of applications programs. The multimedia lab permits researchers to evaluate alternative multimedia applications using both locally-based systems as well as remote systems.